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Safety Awareness for responders to Emergency Operations: Lead

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Overview

- Introduction to Lead
- Health Hazards
- Protection from Exposure

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Objectives of this training - At the end of this short session, you should be able to:

1. Identify the hazards
2. Explain how to protect yourself from these hazards
3. Increase safety and health awareness

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A Few Facts about Lead

- In use for thousands of years
- Toxic to the human body
- Enters the body through inhalation and ingestion
  - Can affect the blood, kidneys, nervous system, and reproductive system
  - May adversely affect the fetus of a worker exposed to lead

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Historical Sources of Lead Exposure

Ancient/Premodern History

- Lead oxide as a sweetening agent
- Lead pipes ("plumbing")
- Ceramics
- Smelting and foundries

Modern History

- Gasoline
- Ceramics
- Crystal glass
- Soldering
  - pipes
  - "tin" cans
  - car radiators
- House paint

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How can I be exposed to Lead?

- Glad you asked. You can get it through
  - Grinding
  - Sanding
  - Spraying
  - Burning
  - Melting
  - Soldering
  - Machining
  - Handling contaminated protective clothing

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The Greatest Hazard

- Comes from lead dust
- Can be easily inhaled or ingested
- Ingestion occurs when personnel eat, drink, smoke, or apply cosmetics without first washing the dust from their hands
- Exposure eliminated through good work practices, good hygiene and respiratory protection

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Lead Exposure

- Torch cutting on structures that are finished with lead containing paint
- Scraping or abrasive blasting to remove lead paint

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How Can Lead Affect My Health?

- Absorbed into the blood stream and affects blood, kidneys, nervous system, and immune system
- Symptoms of lead poisoning include
  - Colic pains
  - Bluish spots on the gums
  - Weakness
  - Constipation
  - Paralysis on hands and forearms

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More Health Effects

- Other chronic effects may include convulsions and permanent nervous system disorders
- In pregnant women, lead may cause fetal damage including:
  - Premature birth
  - Smaller babies
  - Decreased mental ability in the infant
  - Increased possibility of spontaneous abortion

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Reproductive Hazards

- Acute and chronic
  - Depressed sperm count in males and spontaneous abortion in women 40 - 50ug/dl
  - Effects on a fetus (Maternal) 10 - 15ug/dl
    - Low birth weight
    - Premature birth
    - Impaired mental development

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Initial Determination

- Initial determination
  - Previous monitoring
  - Objective data
  - Initial monitoring
- Initial monitoring
  - Representative

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Lead Monitoring

- Frequency of monitoring
  - Exposure at or above the action level (AL) but at or below the permissible exposure limit (PEL) - every 6 months
  - Exposure above the PEL - every 3 months
  - Change in equipment, process, personnel, or a new task is initiated

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Compliance Program

- Prior to the start of each job
- Compliance with the PEL
- Compliance plan shall include
  - Description of each activity
  - Specific means to achieve compliance
  - Technology considered in meeting the PEL
  - Air monitoring
  - Schedule for implementation
  - work practice program
  - Administrative control schedule
  - Multi contractor sites
  - Other information

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Compliance Program

- Frequent and regular inspection of the job site, materials, and equipment by a competent person
- Shall be revised and updated every 6 months to reflect the current status of the program

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Interim Protection

- Lead paint or coatings
  - Manual demolition
  - Manual scraping
  - Manual sanding
  - Heat gun applications
  - Power tool cleaning without dust collection
- Spray painting with lead paint
- Exposure is considered to be above the PEL and not in excess of 10 times the PEL (500ug/m^3)

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Interim Protection

- Task not listed in (d)(2)(i) where the employer has any reason to believe employees may be exposed above the PEL
- Exposure is considered to be in excess of the PEL

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Interim Protection

- Using lead containing mortar
- Lead burning
- Lead paint coatings
  - Rivet busting
  - Power tool cleaning without dust collection
  - Cleanup activities where dry expendable abrasives are used
  - Abrasive blasting enclosure movement and removal
- Exposure is considered to be in excess of 500ug/m^3

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Interim Protection

- Lead paint or coatings
  - Abrasive blasting
  - Welding
  - Cutting
  - Torch Burning
- Exposure is considered to be in excess of 2,500ug/m^3

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Interim Protection

- Respiratory protection - (f)
- PPE and clothing - (g)
- Change areas - (i)(2)
- Hand washing facilities - (i)(5)
- Biological monitoring - (j)(1)(i)
- Training - (l)(1)(i), (l)(2)(ii)(C), & 1926.21

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Workplace Control Practices

- Main goal--prevent lead from entering the body
  - Substitute (use non-lead paint)
  - Keep mechanical grinding to a minimum
    - **Use authorized chemical strippers**
    - **Equip tools with HEPA-filtered exhaust**
  - Minimize heating of leaded materials
    - **Keep below 600º F**

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More Control Practices

- Maintain work surfaces as free of lead dust as possible
  - Use HEPA vacuums and wet methods
- Handle lead waste materials in accordance with Chapter 21 of OPNAVINST 5100.23 (series)
- Isolate hot work on lead from other operations

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More Control Practices

- Use local exhaust ventilation
- Wear protective clothing if possibility of skin or eye irritation exists
- Wear approved respirators if exposure likely to exceed Permissible Exposure Limit (PEL)

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Administrative Controls

- Job rotation Schedule
  - Name or ID number of each employee
  - Duration and exposure levels at each job or work station
  - Any other information useful in assessing the reliability of administrative controls

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Respirators

- NIOSH Approved for lead dust, fume, and mist
- PAPR - when employee chooses to use one and it will provide adequate protection
- Respirator use
  - Properly fitted
  - Respirator program

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Housekeeping

- Keep the area as free of lead contamination as possible and don’t cause lead dust to become airborne

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Hygiene Facilities and Practices

- No eating, drinking or smoking
- Change areas
- Showers
- Eating facilities or areas
- Hand washing facilities

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Medical Surveillance

- Initial medical surveillance
  - Exposed on any day at or above the AL
    - Biological monitoring (blood Sampling)
- Medical surveillance
  - Exposed at or above the AL for more than 30 days in any 12 consecutive months
    - Biological monitoring
    - Medical examinations

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Biological Monitoring

- Every 2 months for 6 months and then every 6 months thereafter
- Blood lead at or above 40ug/dl
  - blood test every 2 months
- Blood lead at or above 50ug/dl
  - Medical removal
  - Follow up blood test within 2 weeks
  - Monthly blood test

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Medical Examinations

- Exposed at or above the AL 30 or more days in any 12 consecutive months
  - Annually if during the preceding 12 month period the blood lead level is at or above 40ug/dl
  - As soon as possible if employee shows symptoms of lead intoxication, employee desires medical advice, employee is pregnant, employee has had difficulty breathing while using a respirator or during a fit test

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Medical Examinations

– As medically appropriate for each employee removed due to a risk of sustaining material impairment to health or otherwise limited pursuant to a final medical determination

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Training

- 1926.59 (Hazard Communication)
- Subject to exposure at or above the AL on any day or to lead compounds that cause skin or eye irritation

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Training

- Annual training for each employee subject to lead exposure at or above the AL on any day

- Training content
  - Content of the standard
  - Nature of operations
  - Respirators
  - Medical surveillance program
  - Engineering controls
  - Compliance plan
  - Chelating agents
  - Access to records

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Signs

- Exposure above the PEL
  - WARNING
    LEAD WORK AREA
    POISON
    NO SMOKING OR EATING

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Lead Warning Sign

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Lead Caution Label